EXHIBIT D

New Claims 36-57	Written Description of U.S. Patent Application No. 10/804,846
36. (New) A hydrogen gas separator, comprising: a first porous layer made from a hydrogen permeable material; and a solid layer of said hydrogen permeable material disposed on said first porous layer and in contact with said first porous layer.	**Page 3, lines 19-23**: In one embodiment, the composite gas separation module includes a porous metal substrate; an intermediate porous metal layer, wherein the intermediate porous metal layer overlies the porous metal substrate; and a dense hydrogen-selective membrane, wherein the dense hydrogen-selective membrane overlies the intermediate porous metal layer. **Page 10, lines 5-7**: The composite gas separation module also includes an intermediate porous metal layer, wherein the intermediate porous metal layer overlies the porous metal substrate. **Page 4, lines 1-2**:The intermediate porous metal layer can include palladium, *e.g.*, the intermediate porous metal layer can include palladium and a Group IB metal. **Page 6, lines 25-26**: The composite gas separation modules described herein include a dense gas-selective membrane such as, for example, a dense hydrogen-selective membrane.

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37. (New) The separator according to Claim 36 further including a porous base layer for supporting said first porous layer.	**Page 3, lines 19-23**: In one embodiment, the composite gas separation module includes a porous metal substrate; an intermediate porous metal layer, wherein the intermediate porous metal layer overlies the porous metal substrate; and a dense hydrogen-selective membrane, wherein the dense hydrogen-selective membrane overlies the intermediate porous metal layer. **Page 9, lines 6-7**:The composite gas separation module of the invention includes a porous metal substrate. Also, Claim 1 of U.S. Provisional Patent Application No. 60/457,061, incorporated by reference in the present application.
38. (New) The separator according to Claim 36 wherein said hydrogen permeable material of said first porous layer and said hydrogen permeable material of said solid layer are the same material.	**Page 4, lines 1-2**:The intermediate porous metal layer can include palladium, *e.g.*, the intermediate porous metal layer can include palladium and a Group IB metal. **Page 6, lines 25-28**: The composite gas separation modules described herein include a dense gas-selective membrane such as, for example, a dense hydrogen-selective membrane. The dense hydrogen-selective membrane can include, for example, palladium or an alloy thereof. **Page 7, lines 27-28**: For example, palladium/silver and palladium/copper alloys can be used to form dense hydrogen-selective membranes.
39. (New) The separator according to Claim 37 wherein said porous base layer is not comprised of hydrogen permeable material.	**Page 9, lines 8-13**: Examples of suitable substrate components include, but are not limited to, iron, nickel, titanium, chromium, aluminum, and alloys thereof, e.g., steel, stainless steel, HASTELLOY® alloys . . . and INCONEL® alloys . . .

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40. (New) The separator according to Claim 36 wherein said first porous layer has a pore size that varies as a function of distance from said solid layer.	**Page 11, lines 7-10**: The intermediate porous metal layer can have a mean pore size that is less than the mean pore size of the porous metal substrate. In one embodiment, the largest pore of the intermediate porous metal layer is smaller than the largest pore of the porous metal substrate.

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41. (New) The separator according to Claim 39 further including at least one bonding layer disposed between said porous base layer and said first porous layer.	**Page 12, lines 7-23**: Without wishing to be held to any particular theory, the improvement in adhesion is thought to result from inter-diffusion of the metal particles of the intermediate porous metal layer and/or intermetallic diffusion between the intermediate porous metal layer and the porous metal substrate on one side and the dense gas-selective membrane on the other side. For example, inter-diffusion can occur when the composite gas separation module is heated to operational temperatures (*e.g.*, about 350°C to about 600°C). The composite gas separation module can further include a substrate surface treatment underlying the intermediate porous metal layer, as described infra. For example, a layer of a ceramic can be bonded to the porous metal substrate and underlie the intermediate porous metal layer. The ceramic can include oxides, nitrides, and/or carbides, for example, iron oxide, iron nitride, iron carbide and/or aluminum oxide. The composite gas separation module can also further comprise a layer of a metal selected from the group consisting of palladium, gold and platinum, wherein the layer of metal overlies the porous metal substrate and/or a substrate surface treatment and underlies the intermediate porous metal layer. Such deposits of metal are discussed infra. **Page 20, lines 4-9**: The present method for forming a composite gas separation module can include surface activating a support prior to deposition of a desired material (e.g., the intermediate porous metal layer, components of the dense gas-selective membrane or a metal deposited on the porous substrate). For example, a porous substrate can be surface activated prior to depositing a hydrogen-selective metal or alloy thereof on the support.

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42. (New) The separator according to Claim 36 further including a second porous layer made of said hydrogen permeable material, wherein said solid layer of said hydrogen permeable material is interposed between said first porous layer and said second porous layer.	**Page 6, line 25 through page 7, line 5**: The composite gas separation modules described herein include a dense gas-selective membrane such as, for example, a dense hydrogen-selective membrane. A "dense gas-selective membrane," as that term is used herein, refers to a component of a composite gas separation module that has one or more layers of a gas-selective material, i.e., a material that is selectively permeable to a gas, and that is not materially breached by regions or points which impair the separation of the gas by allowing the passage of an undesired gas. For instance, in one embodiment, the dense gas-selective membrane is not materially breached by regions or points which do not have the desired gas selectivity properties of the gas-selective material.
43. (New) The separator according to Claim 37 wherein said porous base layer is a sintered powder having a predetermined average particle size.	**Page 9, lines 4-5**: In one embodiment, porous metal substrate 12 also includes a layer of ceramic bonded thereto. **Page 12, lines 14-18**: The composite gas separation module can further include a substrate surface treatment underlying the intermediate porous metal layer, as described infra. For example, a layer of a ceramic can be bonded to the porous metal substrate and underlie the intermediate porous metal layer. The ceramic can include oxides, nitrides, and/or carbides, for example, iron oxide, iron nitride, iron carbide and/or aluminum oxide. Also, Claims 1 and 2 of U.S. Provisional Patent Application No. 60/457,061, incorporated by reference in the present application.

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44.	(New) The separator according to Claim 43 wherein said first porous layer is comprised of multiple thick film layers, wherein each of said thick film layers has a different average particle size of said hydrogen permeable material.	**Page 10, lines 24-29**: In one embodiment, the intermediate porous metal layer contains about three to about six layers of palladium that alternate with about 2 to about 4 layers of the Group IB metal. The thickness of the individual alternating layers can be about 0.05 to about 5 microns thick, *e.g.*, about 0.1 to about 4 microns, about 0.2 to about 3 microns, or about 0.3 to about 1.5 microns. Examples of the order of the deposited layers include, but are not limited to, Pd-Ag-Pd-Ag-Pd and Pd-Ag-Pd-Ag-Pd-Pd-Ag-Pd-Ag-Pd. **Page 12, lines 19-23**: The composite gas separation module can also further comprise a layer of a metal selected from the group consisting of palladium, gold and platinum, wherein the layer of metal overlies the porous metal substrate and/or a substrate surface treatment and underlies the intermediate porous metal layer. Such deposits of metal are discussed infra.
45.	(New) The separator according to Claim 36 wherein said solid layer of said hydrogen permeable material is a deposition layer that is deposited onto said first porous layer.	**Page 16, lines 4-10**: Components of the dense gas-selective membrane, *e.g.*, a hydrogen-selective metal or an alloy thereof, can be deposited over the intermediate porous metal layer using any of the techniques known in the art for depositing such materials on a support. For example, a component of the dense gas-selective membrane can be deposited on the support using electroless plating, thermal deposition, chemical vapor deposition, electroplating, spray deposition, sputter coating, e-beam evaporation, ion beam evaporation or spray pyrolysis.
46.	(New) The separator according to Claim 37 wherein said porous base layer is shaped as a tube that defines a central conduit, wherein said first porous layer surrounds said base layer, and said solid layer surrounds said first porous layer.	**Page 8, lines 22-26**: The Figure illustrates cylindrical composite gas separation module 10 as one embodiment of the invention. Composite gas separation module 10 includes porous substrate 12, intermediate porous metal layer 14, and dense gas-selective membrane 16. As illustrated, intermediate porous metal layer 14 and dense gas-selective membrane 16 overlie the outside surface of cylindrical porous substrate 12.

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47. (New) A method of purifying hydrogen gas, comprising the steps of: providing a hydrogen permeable structure having a porous layer of hydrogen permeable material covered by a solid layer of hydrogen permeable material; exposing said hydrogen permeable structure to a gas containing hydrogen gas; and causing a pressure differential across the hydrogen permeable structure, wherein said hydrogen gas permeates through said hydrogen permeable structure and is collected.	**Page 16, lines 22-30**: In one aspect the present invention includes a method for selectively separating hydrogen gas from a hydrogen gas-containing gaseous stream, by which method, hydrogen gas is at least partially partitioned from the gaseous stream by passing through a dense hydrogen-selective membrane. The method includes directing the hydrogen gas-containing gaseous stream to a composite gas separation module, wherein the composite gas separation module includes: (a) a porous metal substrate; (b) an intermediate porous metal layer, wherein the intermediate porous metal layer overlies the porous metal substrate; and (c) a dense hydrogen-selective membrane, wherein the dense hydrogen-selective membrane overlies the intermediate porous metal layer. Also, Claim 27 of U.S. Provisional Patent Application No. 60/457,061, incorporated by reference in the present application.
48. (New) The method according to Claim 47 wherein said hydrogen permeable structure is tubular and said step of exposing said hydrogen permeable structure includes passing gas though said hydrogen permeable structure under pressure.	**Page 8, lines 22-26**: The Figure illustrates cylindrical composite gas separation module 10 as one embodiment of the invention. Composite gas separation module 10 includes porous substrate 12, intermediate porous metal layer 14, and dense gas-selective membrane 16. As illustrated, intermediate porous metal layer 14 and dense gas-selective membrane 16 overlie the outside surface of cylindrical porous substrate 12. **Page 17, lines 9-14**: A pressure gradient of hydrogen, wherein the hydrogen partial pressure of the hydrogen gas-containing gaseous stream is greater than the hydrogen partial pressure on the opposite side of the gas separation module, can be maintained to increase the flux of hydrogen through the dense hydrogen-selective membrane of the composite gas separation module.

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49. (New) The method according to Claim 47 further including the step of supporting said hydrogen permeable structure with a porous base layer of material.	**Page 4, lines 9-17**: In one embodiment of the invention, a method for selectively separating hydrogen gas from a hydrogen gas-containing gaseous stream includes the step of directing the hydrogen gas-containing gaseous stream to a composite gas separation module, wherein the composite gas separation module includes a porous metal substrate; an intermediate porous metal layer, wherein the intermediate porous metal layer overlies the porous metal substrate; and a dense hydrogen-selective membrane, wherein the dense hydrogen-selective membrane overlies the intermediate porous metal layer. By this method, hydrogen gas is at least partially partitioned from the gaseous stream by passing through the dense hydrogen-selective membrane. **Page 9, lines 6-7**:The composite gas separation module of the invention includes a porous metal substrate.
50. (New) The method according to Claim 47 wherein said hydrogen permeable material of said porous layer and said hydrogen permeable material of said solid layer are the same material.	**Page 4, lines 1-2**:The intermediate porous metal layer can include palladium, *e.g.*, the intermediate porous metal layer can include palladium and a Group IB metal. **Page 6, lines 25-28**: The composite gas separation modules described herein include a dense gas-selective membrane such as, for example, a dense hydrogen-selective membrane. The dense hydrogen-selective membrane can include, for example, palladium or an alloy thereof. **Page 7, lines 27-28**: For example, palladium/silver and palladium/copper alloys can be used to form dense hydrogen-selective membranes.

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51. (New) A method of manufacturing a hydrogen gas separator, comprising the steps of: forming a first porous layer from a hydrogen permeable material; and depositing a solid layer of said hydrogen permeable material over said porous layer.	**Page 3, lines 24-27**: A method for fabricating a composite gas separation module includes applying an intermediate porous metal layer over a porous metal substrate and applying a dense hydrogen-selective membrane over the intermediate porous metal layer, thereby forming the composite gas-separation module.
52. (New) The method according to Claim 51 further including the step of forming contours in said solid layer.	**Page 16, lines 4-6**: Components of the dense gas-selective membrane, *e.g.*, a hydrogen-selective metal or an alloy thereof, can be deposited over the intermediate porous metal layer using any of the techniques known in the art for depositing such materials on a support. **Page 24, lines 7-11**: n another embodiment, a first component of the dense gas-selective membrane can be applied over the intermediate porous metal layer, the deposited first component can be abraded, and a second component of the dense gas-selective membrane can be applied over the abraded, deposited first component.
53. (New) The method according to Claim 51 further including the step of forming a second porous layer of said hydrogen permeable material, wherein said solid layer is interposed between said first porous layer and said second porous layer.	**Page 6, line 25 through page 7, line 5**: The composite gas separation modules described herein include a dense gas-selective membrane such as, for example, a dense hydrogen-selective membrane. The dense hydrogen-selective membrane can include, for example, palladium or an alloy thereof. A "dense gas-selective membrane," as that term is used herein, refers to a component of a composite gas separation module that has one or more layers of a gas-selective material, i.e., a material that is selectively permeable to a gas, and that is not materially breached by regions or points which impair the separation of the gas by allowing the passage of an undesired gas. For instance, in one embodiment, the dense gas-selective membrane is not materially breached by regions or points which do not have the desired gas selectivity properties of the gas-selective material.

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54. (New) The method according to Claim 51 further including the step of forming a porous base layer of material and supporting said first porous layer with said porous base layer.	**Page 14, lines 12-17**: Preparation of the porous substrate can also include surface treatment; formation of an additional intermetallic diffusion barrier such as by oxidizing the substrate, described infra; surface activation; and/or deposition of a metal such as palladium, gold or platinum, as described infra, prior to applying the intermediate porous metal layer over the porous metal substrate.
55. (New) The method according to Claim 54 further including the step of bonding said first porous layer to said porous base layer.	**Page 12, lines 7-23**: Without wishing to be held to any particular theory, the improvement in adhesion is thought to result from inter-diffusion of the metal particles of the intermediate porous metal layer and/or intermetallic diffusion between the intermediate porous metal layer and the porous metal substrate on one side and the dense gas-selective membrane on the other side. For example, inter-diffusion can occur when the composite gas separation module is heated to operational temperatures (*e.g.*, about 350°C to about 600°C).

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56. (New) A hydrogen gas separator, comprising: a first porous layer made from a first hydrogen permeable material; and a solid layer of a second hydrogen permeable material disposed on said first porous layer and in contact with said first porous layer.	**Page 3, lines 19-23**: In one embodiment, the composite gas separation module includes a porous metal substrate; an intermediate porous metal layer, wherein the intermediate porous metal layer overlies the porous metal substrate; and a dense hydrogen-selective membrane, wherein the dense hydrogen-selective membrane overlies the intermediate porous metal layer. **Page 10, lines 5-7**: The composite gas separation module also includes an intermediate porous metal layer, wherein the intermediate porous metal layer overlies the porous metal substrate. **Page 4, lines 1-2**:The intermediate porous metal layer can include palladium, *e.g.*, the intermediate porous metal layer can include palladium and a Group IB metal. **Page 6, lines 25-26**: The composite gas separation modules described herein include a dense gas-selective membrane such as, for example, a dense hydrogen-selective membrane.
57. (New) The hydrogen gas separator of Claim 56 wherein the first hydrogen permeable material and the second hydrogen permeable material are the same material.	**Page 4, lines 1-2**:The intermediate porous metal layer can include palladium, *e.g.*, the intermediate porous metal layer can include palladium and a Group IB metal. **Page 6, lines 25-28**: The composite gas separation modules described herein include a dense gas-selective membrane such as, for example, a dense hydrogen-selective membrane. The dense hydrogen-selective membrane can include, for example, palladium or an alloy thereof. **Page 7, lines 27-28**: For example, palladium/silver and palladium/copper alloys can be used to form dense hydrogen-selective membranes.